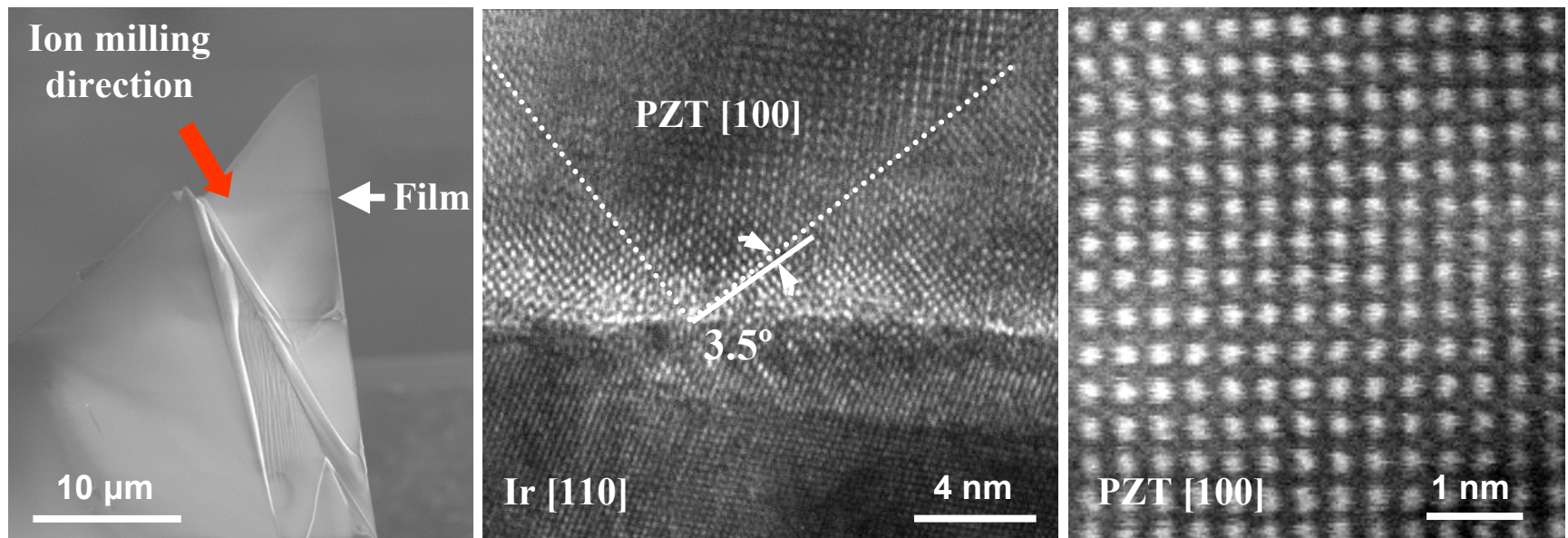


The FIB Shadow Technique for Ferroelectrics

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Ferroelectric thin films such as Pb , $\text{Zr}_{(0.3-0.35)}$, $\text{Ti}_{(0.65-0.7)}$, O_3 (PZT) are sensitive to delamination during sample preparation for TEM analysis. The focused ion beam (FIB) shadow technique enables gentle thinning to electron transparency by ion-bombarding of the sample from the film-backside while minimizing contamination. This technique has been successfully applied to a broad variety of materials including thin films, single crystals, metal-ceramic compounds and bio materials enabling atomic resolution imaging and analysis to be performed.



Left: Thin film sample prepared using FIB shadow technique (SEM image).

Middle: PZT/Ir interface showing domain structures in PZT grain (HRTEM image).

Right: Tetragonal PZT film (high-resolution Z-contrast image).

Remote Access Atomic Resolution Microscopy

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In collaboration with colleagues in the national center for electron microscopy (NCEM) at Lawrence Berkeley National Laboratory (LBNL) we are developing the ability to control the TEM through a web access control panel over the internet. The aim of the remote access is to allow students and faculty to perform the highest resolution experiments without having to travel to the microscope facility.



Capabilities as such provide the perfect demonstration tool for outreach activities on the nanoworld and for undergraduate and graduate lectures.